Claims 1 and 5 were rejected under 35 U.S.C. 102(b) as being anticipated by DE 43 05 414 A1 to Wandke. In this respect, the Examiner states that Wandke teaches coating a substrate with a metal oxide layer, especially a stannic oxide layer, in a vacuum in which a corresponding metal target is inserted into a corresponding chamber and eroded, and this erosion coats the substrate, whereby an oxygen-containing plasma arising from a corresponding basic gas mixture is created in the area between the target and substrate. Further, referring to page 1 of the Wandke translation, the Examiner indicates that the disadvantage of this process, namely that the oxidizing atmosphere also affects the target, and the target surface becomes increasingly coated with oxide which negatively influences the overall procedure as, e.g. the coating rate deceases, is solved by using a balanced oxidizing and reducing basic gas mixture consisting of at least 20 percent by volume oxygen, hydrogen and a gaseous hydrocarbon or halogenated hydrocarbon in the coating procedure. This mixture may also contain 5-40 percent by volume argon.

The applicants believe it is important first to note that the sputtering process always causes the ionization of components of the sputtering atmosphere. As a consequence, hydrogen (H_2) contained in the sputtering atmosphere will disintegrate into hydrogen ions. However, any hydrocarbons additionally will disintegrate, also producing hydrogen ions and respective remaining hydrocarbon ions. Accordingly, both a hydrogen containing sputtering atmosphere as known from prior art as well as a hydrocarbon containing sputtering atmosphere according to the invention will give rise to hydrogen ions and this common feature has been integrated into the introductory part of claim 14. However, this should not be interpreted as evidence or admission that a hydrogen containing sputtering atmosphere is equivalent to or makes obvious a hydrocarbon containing sputtering atmosphere for a process for producing an electrochromic coating.

Wandke does not anticipate the present invention set forth in new claims 14 and 19 as Wandke is directed to general sputtering techniques and is concerned with improving these techniques which suffer from the target surface being coated with oxides. As the solution, Wandke discloses a gas mixture for the sputtering process, consisting of at least 20% volume of each oxygen, hydrogen and a gaseous hydrocarbon or halogenated hydrocarbon. However,

Wandke does not relate to electrochromic coatings, since Wandke refers to sputtering tin oxide, with is not a typical electrochromic material. Especially, for electrochromic elements using lithium ions as charge carriers, tin oxide is unsuitable as an electrochromic coating.

The present invention aims at improving the process for producing electrochromic coatings on a substrate, for example glass. The problem which is to be solved by the present invention is to improve a process called conditioning, to which electrochromic coatings have to be subjected before they have a sufficiently high reversible storage capacity for ions which makes them suitable for use in electrochromic pane arrangements. The applicants have surprisingly found that a process for producing electrochromic coatings by sputtering in an atmosphere containing a noble gas and hydrocarbon along with oxygen, produces electrochromic coatings having a significantly reduced blind charge. This can be seen in Examples 1 to 4, summarized in Table 1. The effect of the blind charge thus reduced is that the electrochromic coatings which are a product of the inventive production process herein claimed, show a higher coloring efficiency.

The features now contained in new claim 14 and claim 19 dependent thereon clearly patentable distinguish over the cited Wandke publication because the skilled person interested in improving electrochromic coatings will not turn to Wandke for a solution to problems of coloring efficiency or improved conditioning because Wandke only refers to coatings of SnO, which is unsuitable for electrochromic elements having lithium ions as charge carriers. Furthermore, the skilled person knows that the sputtering target which is most often used in the production of electrochromic coatings is tungsten, which can be sputtered in a normal argon and oxygen containing sputtering atmosphere without the problems of surface contamination with oxides, as is the case for tin according to Wandke.

Still further, there is no obvious connection between the use of a hydrocarbon containing sputtering atmosphere and its effect on the electrochromic coating, namely the reduction of its blind charge produced by the hydrocarbon contained in the sputtering atmosphere. Accordingly, the effect of using a hydrocarbon containing sputtering atmosphere with respect to the blind charge of the coating and its improved properties of a higher coloring efficiency are neither

disclosed in Wandke nor can they be inferred from Wandke. Consideration and allowance of claims 14 and 19 are, accordingly respectfully requested.

Cancelled claims 1-11 were rejected under 35 U.S.C. 103 (a) as being unpatentable over DE 43 05 414 A1 in view of U.S. Patent No. 6,277,523 to Giron. In this respect, the Examiner takes the position that Giron teaches an inhibited electrochromic layer of WO_3, Nb_2O_3, SnO_2, Bi_2O_3, TiO_2,V_2O_5, hydrogenated nickel oxide or MoO_3 material which exists in a decolored or only slightly colored state, and that all the oxide-based layers are obtained by this technique using a metal target, but in a reactive atmosphere containing oxygen. Continuing, the Examiner states that since Giron teach utilizing a metal target to deposit the corresponding metal oxide it would be obvious to utilize targets containing tungsten, molybdenum, titanium, cerium, vanadium and/or zirconium.

The Examiner submits that the motivation for depositing electrochromic layers utilizing targets of metals for depositing the particular compositions of the layers in particular atmospheres at particular thicknesses by sputtering is that it allows for simplifying the method of manufacturing of the electrochromic devices. Concluding, the Examiner postulates "it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Wandke by depositing electrochromic layers utilizing targets of metals for depositing the particular compositions of the layers in particular atmospheres at particular thicknesses by sputtering as taught by Giron because it allows for simplifying the methods of manufacturing of the electrochromic devices."

The applicants submit that Giron discloses a technique for producing electrochromic glazings using a metal target and sputtering in a reactive atmosphere containing both oxygen and optionally hydrogen. Giron does not disclose the use of a hydrocarbon containing sputtering atmosphere as called for in all of claims 14 to 29, inclusive.

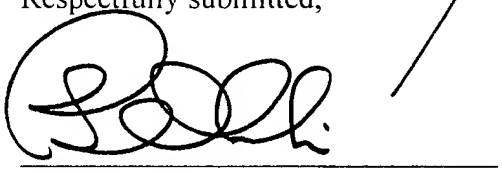
It is earnestly urged that one skilled in the art would not look to Wandke in order to modify the sputtering atmosphere of Giron because Wandke only refers to tin as a sputtering target metal, which is generally unsuitable for electrochromic coatings, especially those based on the insertion of lithium ions. In other words, the combination of Wandke and Giron can only be

made in retrospect as Wandke does not give any hint as to the effects the hydrocarbon containing sputtering atmosphere would have on the resulting electrochromic coating. It is only in knowledge of the present invention that the skilled person would have a motivation to alter the sputtering conditions of Giron by introducing the hydrocarbon sputtering atmosphere of Wandke since no relation between the electrochromic properties, i.e. ion insertion properties, resulting from the preconditioning process and the hydrocarbon containing sputtering atmosphere is mentioned or can be made in an obvious manner. Accordingly, any rejection of claim 14 and claims 15 to 29 dependent thereon based on a combination of the Wandke and Giron disclosures is untenable whereby allowance of claims 14 to 29 is urged to be in order.

In view of the presentation of new claims 14 to 29, applicants believe the pending claims under consideration define patentable subject matter over the art of record and are in formal compliance with the patent statutes. Therefore, the application is urged to be condition for allowance and an early and favorable action to that end is courteously solicited.

Should the Examiner wish to modify any of the language of the claims, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,



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